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Considerations Related to Specific Topics of Food Science in School Education

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Abstract

The paper aims to present the results of the activity entitled ‘’Critical analysis of the national curricula related to nutrition, health and food safety’’, activity made in the frame of the Erasmus+ Project *Let’s make it better! Raising the awareness of the triad nutrition-health-food safety in school education*. The analysis was needed in order to design the most suitable training process for teachers in preschool, primary and secondary education regarding the relation between nutrition, eating habits and health status. The knowledge acquired constitutes the basis of the integration of food science education and related subjects within the curricula, based on an innovative approach.

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Keywords: Food science education, curricula analysis, people health and wellbeing, EduForHealth Project

1. Introduction

Europe 2020, the growth strategy of the European Union for the future period, stipulated that one of the five ambitious objectives refers to education, the final target being the EU development as a sustainable economy.

The Joint Programming Initiative *A healthy diet for a healthy life* (2011), document which describes the Strategic Research Agenda for the period 2011-2020 and beyond, underlines the importance of the human nutrition and the incidence of the diet-related diseases nowadays. Thus, high quality diet it is considered one of the critical determinants in human health.

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On the other part, despite of the efforts made by the policy makers inside the axis health - food, numerous scientific papers related to school education draw attention on the fact that a significant proportion of teens and adults have never learned the basic principles of food safety, as consequence being unable to protect themselves and their future families. A lot of explanations are identified, the main being the decreasing of the number or even the elimination of specialized courses from curriculum, respectively the increasing of the convenience of consumption partially or fully prepared. Thus, unsafe food handling could generate foodborne illness, an effective educational intervention starting even at pre-primary level being necessary with a view to diminish this risk (Medeiros, Hillers, Kendall &, Mason, 2001). Moreover, there is a disconnection between school students' food safety knowledge, perceptions, and behaviors (Haapala & Probart, 2004).

At the European level a lot of statistics were made insight correlation between youth education, health, food science. According Eurobarometer, Qualitative Studies *Well-being* (Aggregate report, September 2011), between factors which contribute to well-being could be enumerated the subjective well-being, education and intellectual development, respectively health and nutrition.

Another recent Special Eurobarometer 389 *Europeans' attitudes towards food security, food quality and the countryside* (July 2012) highlights that respondents who are in the 15-24 age group (58%), have fewer years of education (59%) or have difficulty paying bills (60%), are less likely to check for quality labels. Only a minority of EU citizens recognise logos of EU food quality assurance schemes.

In the above mentioned context the general objective of the Erasmus + Project *Let's make it better! Raising the awareness of the triad nutrition-health-food safety in school education* is to restore the place of the life sciences (oriented on nutrition and food safety education) in the culture of the young people, encouraging their appetite for careers in science and in entrepreneurship, respectively to develop networks between various actors from the scientific world: universities, schools, research institutions, scientific laboratories, associations, centers of culture etc.

2. Method and results

2.1. Background

The structure of the education system in Romania includes 4 main levels for pre-university education (pre-school, primary school, inferior secondary education, superior secondary education) and 3 main levels for university education.

In preschool education (not compulsory) are included children aged between 3 years and 6/7 years. There are 3 types of Pre-schools: *kindergarten* (opened from 7.a.m. to 13.a.m., not offering meals – children are having a breach about 10.a.m. to eat sandwiches/fruits/etc taken from home), *kindergarten with extended program* (from 6.a.m. to 6.p.m.) - were children have breakfast, lunch and a snack after sleeping in the afternoon - , and *kindergarten with weekly program*, similar to care centers. Pre-school education is divided into two levels: first level aims socialization of children aged 3 to 5 years and the second level aims preparing for school children aged between 5 and 6/7 years.

General education is compulsory for ten classes (I to X), age of onset of schooling is 6 years (or 7 years at the request of parents). The age of ending the compulsory education is 16/17 years. After ten classes, adolescents are following classes IX and X, that, from the 2003 are granted with graduation certificate. At the end of high-school, children can take the baccalaureate examination, in order to obtain the Baccalaureate Diploma that is the condition for entering in university education level.

Primary education includes preparation class (or 0 class) and grades I to IV, usually with morning program. Age of completion of primary education is 10/11 years.

Lower secondary education or *middle school* includes grades V-VIII and generally operate as educational day form. It ends with supporting papers for classes VII and VIII. End of middle school is at 14/15 years of age, and consist in a general national exam –called Capacity Exam. Depending on the results of this exam, children can go to High School or Schools of arts and crafts

Upper secondary education includes high schools, lasting four years (grades IX-XII), having daily course, or evening classes and even distances learning. High school is divided into three branches: *theoretical*, having profiles sciences and humanities; *technology*, having profiles exploitation of natural resources, environmental protection, and services; *technical and vocational branch*, having profiles: artistic, sports and theological. High-school education concludes with a national baccalaureate exam.

The National Health Education Program was inaugurated in 2001 and in 2002 was developed an implementation strategy for Health Education. Between 2003 and 2004, there is an intense activity for curriculum development: there are printed curricula and informative guide-lines, are trained education inspectors and biology teachers. At the end of 2005, nearly 9.000 teachers in many schools in Romania conducted Health Education classes.
Currently Health Education Program is conducted at the national level in many schools and colleges in Romania (~2/3 of school units).

The National Programme "Health Education in Romanian schools" (Ministerul Educatiei si Cercetarii, 2004) aims to:

1. promote the health and wellbeing of the student, namely: optimal functioning in terms of somatic, physiological, mental, emotional, social and spiritual; formation of a healthy lifestyle.
2. the student's personal development, namely: self-knowledge and building a positive image of himself; communication and interpersonal skills; stress management; personal career development.
3. prevention, namely: prevent accidents and health risk behaviors; prevent negative attitudes towards oneself and life.

Health Education can be teach as an optional subject (full quote) and / or integrated into other disciplines, and as extracurricular activity. The main goal of health education is to form a responsible attitude and behavior among students towards their own health and that of others.

2.2. Method

The research was exploratory (up to this moment no research was made to identify the current state of implementation of curricula related to nutrition, health and food security at national level), including both qualitative and quantitative methods (qualitative analysis of documents, questionnaire, focus group).

The research addressing mentioned above issue had the following objectives:

- O1. To identify the content of education related to nutrition, health and food security for every educational level
- O2. To identify the perceptions of teachers regarding factors that may influence design practices and application of the curriculum.
- O3. To identify best practice of teaching-learning-assessment used in health education classes in each educational level

To address all the above mentioned objectives, several steps have been taken:

- S1. Content analysis of existing health education curriculum targeting the topics related to nutrition, health and food safety (for O1)
- S2. Questionnaire based survey for teachers that are involved in implementation of health education from pre-school level to high school level (for O2, O3)
- S3. Analysis, processing and interpretation of data obtained in the previous steps.

The universe of research consisted of actors involved in the health education implementation, respectively teachers group formed by teachers for kindergartens, primary schools, secondary inferior schools (middle schoosl), secondary superior schools (high-schools) covering several disciplines (natural science, biology, chemistry, technology).

The research sample was established by the stratified sampling for teachers group, being representative, reported the total number of school units at national level (county covering) for preschool, primary and secondary education:

- 63 school units from different counties, 25 from rural areas (7 kindergartens, 18 schools covering primary and secondary education) and 38 from urban areas (13 kindergartens, and 25 schools covering primary and secondary education)
- 260 teachers, respective 60 preschool teachers, 60 primary school teachers, and 140 teachers for secondary education.

2.3. Findings and results

2.3.1. Curricula of Health Education in Romania

Health Education is an trans- and inter-disciplinary discipline and can be taught as a singular course – optional (being a part of School Decision Curricula) – or as themes in other disciplines - like Natural Science in primary school, Biology, Chemistry, Technological Education and Master Class in secondary education. The themes of Health Education cover a lot of subjects, including the one related to nutrition, health and food safety.

2.3.1.1. Forms of education related to nutrition, health and food security for every educational level

In preschools curriculum design is addressing on of the 6 main annual themes: Who is/are?; How is/was and will be here on earth?; With what and how we express what we feel?; What and how I want to be?; Who and how to plan/organize an activity?; When, how and why it happens.
The subjects addressing education related to nutrition, health and food security are usually content of a week/ day project involving the first and the last theme, discussed once per month.

*In primary education***,** topics of Food Education are taught in courses of Health Education and in other compulsory courses (like Environmental Science) through various discussions about the subject inside a topic specific for science curricular area.

In secondary education level: food education is made inside classes of Health Education and various discussions about the subject through another classes (like biology – specifically for 5th and 6th grade, chemistry – specifically the 8th grade, technological education – only for 5th grade –, and master classes – in all grades).

2.3.1.2. The repartition of this topic in different disciplines (Figure 1).

It is important to retain that Health Education is optional, from primary school to high-school), both Environmental Sciences (grades 3 and 4) and Biology (grades 5 to 12) are compulsory, Technological education is compulsory from 5th to 8th grade, Chemistry is compulsory from grades 7 to 10 or 12 - in science profile high schools, while Master Class varies between 1% and 3%, depending on class level, students' interests and residential zone.

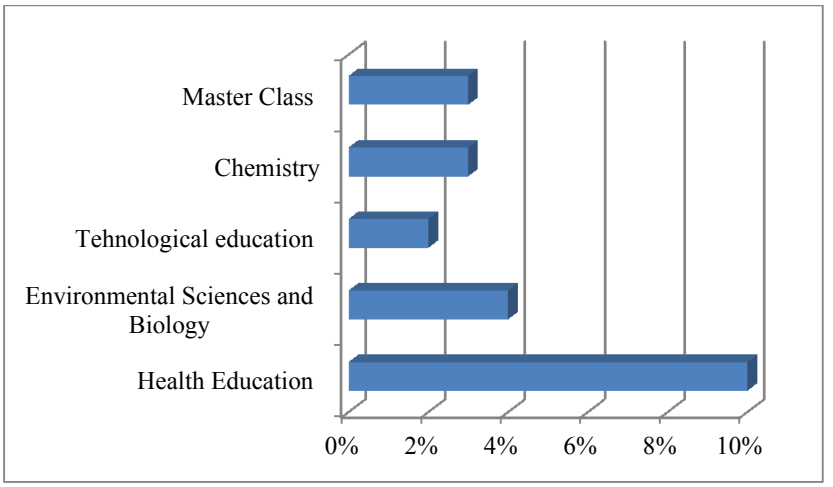

Fig. 1.The repartition of Food science education in different disciplines

Repartition of the content of education related to nutrition, health and food security for primary and secondary education is showed in Fig. 2.

2.3.1.3. Analysis of Health Education Curriculum

The curriculum of Health Education Discipline *is developed in modular version*. Modular organization aims to give the user a flexible basis for implementing the national program for health education in Romanian schools

within the School Decision Curriculum.

The modules are presented in accordance with the format and compulsory education programs for high school. They are developed in vertical and horizontal coherence, in relation to purchases of common core set for those classes. Proposed modules can be used: in the class, watching all the benchmarks or a selection/adaptation of them, through the nine content areas (inside those areas the teacher may establish sub-themes that are the most relevant for the target group); or can be used in two grades, through delimitation of benchmarks (or through selecting/adapting some of them), through multiplying learning activities and, if necessary, by completing of all topics under the 9 mandatory fields. Consequently, modular structure gives the following advantages: ensuring progression in acquisitions for the student that is following this optional over several years of study; the development of specific skills and behaviors in health education and the covering of all areas of the discipline content even if the students choose only one-time throughout the hole school years for this optional; students have the opportunity to discover the area and to integrate it into its cognitive and affective structures; articulation of formal, non-formal and informal learning.

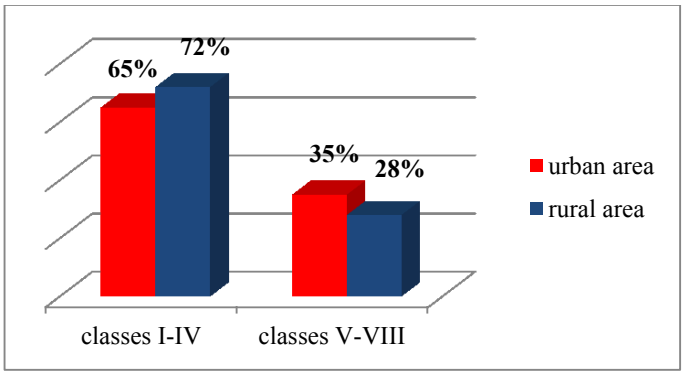

Fig. 2. The repartition of content of Food science education for primary and secondary school

2.3.2. Results of questionnaire based survey for teachers

2.3.2.1. Identified perceptions of teachers regarding factors that may influence design practices and application of the curriculum of education related to nutrition, health and food safety:

- Lack or insufficient number of manuals, guidelines for teachers and students, brochures, audio tapes, videos, CDs etc.
- Insufficient training of teachers in order to achieve quality health education classes in schools and the low recognition rates by educational system
- There is no teacher specialised in health education, much less in education related to nutrition, health and food safety; teachers who do health education are teachers of different specialties: most of them biology, environmental sciences, pphysical education or chemistry)
- The optional status of Health Education Discipline
- Fewer hours allocated inside discipline (health education) to education related to nutrition, health and food safety, in secondary level of schooling, compared to preschool and primary school
- Low awareness of the need for education related to nutrition, health and food safety in students and parents

Summarizing, at the Question: "What are the themes you frequently approached within classes/ activities of Health Education?" were obtained the data from Fig. 3, while at the Question "Which of the below contents do you usually address within classes / activities on nutrition, health and food safety?", the data from Fig. 4.

At the Question ''What kind of information related to related to nutrition, health and food safety do you feel the need to deepen?'' the teachers mentioned that every subject related to nutrition, health and food safety need deepening and, even though they feel comfort with most of the subjects, they need more information (related to functional foods, genetically modified organisms, food additives, dietary risks, food allergies, prevention of

diseases, food labelling, microorganisms in food and so on).

2.3.2.2. The state of teachers' knowledge related to nutrition, health and food safety

The kindergarten teachers' knowledge related to nutrition, health and food safety allows them to cover all activities involving these topics.

Teachers for primary and secondary levels have a minim level of information on the topics: basic composition of foods (carbohydrates, fats, proteins, vitamins, minerals, biologically active compound), the role of nutrients in the body functioning and maintenance of health; they have very little or no information on the following topics: biologically active compounds and their implications and promoting and maintaining wellness, risk consumption of chemicals in food (e.g. heavy metals, pesticides, toxins, poisons industrial), biological risk factors in food (pathogenous and adulteration microorganisms, microbiological toxins), chemical and biological risks and their prevention, nutrition food labeling, and the concept of RDA (recommended daily allowance).

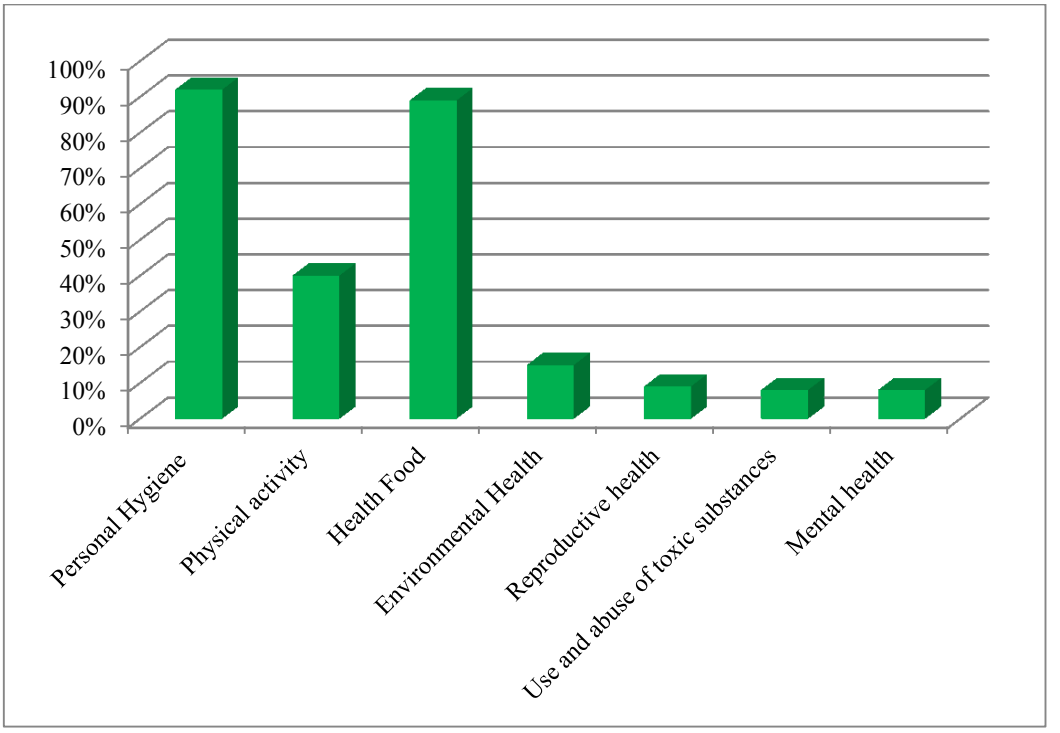

Fig.3. The themes frequently approached by teachers within classes/ activities of Health Education

2.3.2.3. Best practices of teaching-learning-assessment for Health Education in each educational level (in teachers' opinion)

All strategies of teaching and learning are interactive ones, as follows:

For preschool level: role play, didactic play, observation, experiential methods, assessment through practical tests

For primary school level: role play, experiential methods, project method (for learning and for assessment), practical tests, oral assessments

For secondary school level: brainstorming, problem solving, role play, case study, conversation, I know / I want to know / I have learned, debates, Philips 6.6., cube method, mosaic method; for assessment are considered best practice: practical tests, self-assessment, projects, portfolios, essays.

No matter children age, *the most preferred activities are experiential ones*, visiting various organizations implicated in promoting and maintaining a health condition and children's clubs.

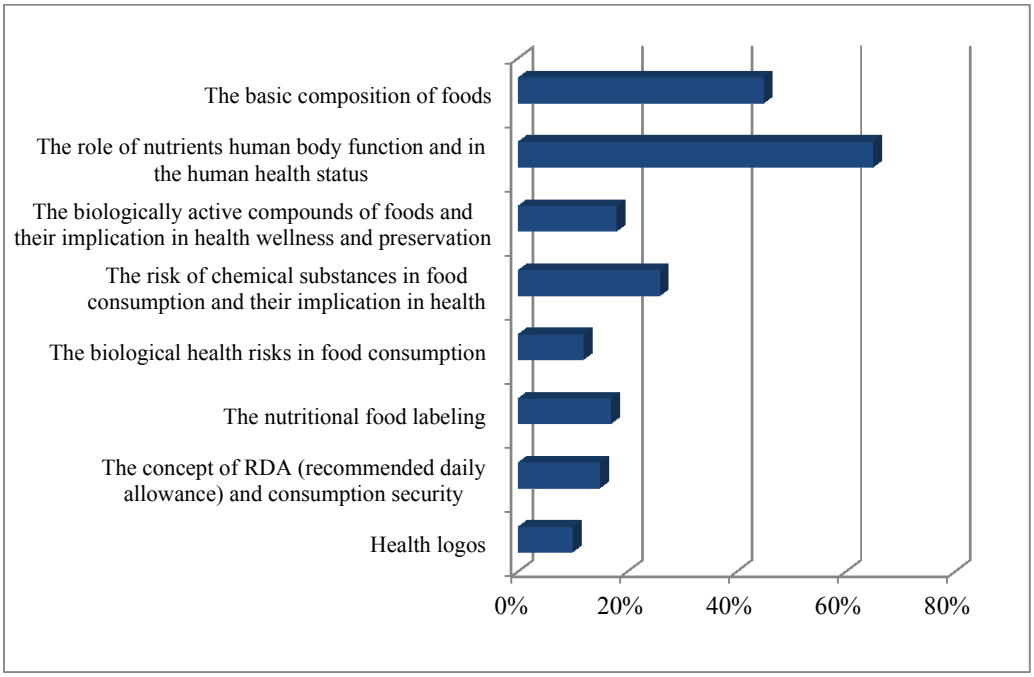

Fig. 4. The contents usually addressed by the teachers within the classes / activities on nutrition, health and food safety

3. Conclusions

In Romania, Health Education begins from early education and continues through all levels of pre-university education, but in a small measure regarding food education and its impact on personal and social health and life quality. There is a great need for training of the teachers, specifically those from primary and secondary education levels, for a better understanding of topics related to nutrition, health and food safety. On teaching strategies, was observed the preference for interactive, experiential methods, like "learning by doing" in every educational level. There for the teachers reclaim a great need for curriculum tools and teaching technologies (like manuals, guidelines for teachers and students, brochures, audio tapes, videos, CDs etc.) that would ensure a better correlation between the scientific content of the Health Education courses and teaching strategies.

Also, the process of implementation of education related to nutrition, health and food safety, both in curricular and extracurricular education is excessively bureaucratic, takes too much time and effort of the management staff and teaching staff. So there is a need for change in management process and educational policies regarding health education.

Acknowledgements

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